III. CLAIM AMENDMENTS

1. (Currently Amended) A method of controlling an optical signal, comprising ~~the steps of~~:

~~(a) determining at least one actual beat frequency derived from a superposition of at least one optical reference signal with the optical signal having an actual frequency, and~~

~~(b) using the at least one actual beat frequency in order to control the actual frequency~~

superimposing at least one optical reference signal and the optical signal to obtain at least one interference signal having an actual beat frequency, and

pre-selecting one or more of the at least one interference signals using a predetermined bandwidth and a filter characteristic that is asymmetric with respect to an actual frequency of the optical signal, to determine a position of the optical signal relative to the at least one optical reference signal.

2. (Currently Amended) The method of claim 1, ~~comprising a step of:~~

~~providing~~ wherein the at least one optical reference signal is provided from a comb of a plurality of optical reference signals~~, preferably~~ controlled by an electrical master clock signal.

3. (Currently Amended) The method of claim 1,

~~wherein step comprises a step of~~including controlling the actual frequency by at least substantially matching the ~~at least one~~ actual beat frequency with at least one target beat frequency.

4. (Currently Amended) The method of ~~claim 1~~claim 3,

wherein the at least one target beat frequency is determined by a superposition of the at least one optical reference signal with a target frequency of the optical signal.

5. (Currently Amended) The method of claim 1, further comprising:

~~prior to step a step of~~ adjusting the actual frequency to be in a predetermined frequency range prior to obtaining the at least one interference signal having an actual beat frequency.

6. (Currently Amended) The method of ~~claim 1~~claim 5,

wherein the predetermined frequency range ~~of the actual frequency~~ covers a frequency of at least one of the at least one optical reference signal.

7. (Currently Amended) The method of claim 1, further comprising ~~the steps of~~:

~~preselecting the superimposed signal comprising the at least one actual beat frequency within a predetermined bandwidth before detecting it~~ pre-selecting one or more of the at least one interference signals to avoid a saturation of a detector detecting the optical signal.

8. (Cancelled)

9. (Cancelled)

10. (Currently Amended) The method of claim 1, further comprising ~~the steps of~~:

separately predetermining ~~the~~an actual frequency of the optical signal~~,~~

~~preselecting the superimposed signal comprising the at least one actual beat frequency within a predetermined bandwidth before detecting it, the predetermined bandwidth covering the predetermined actual frequency of the optical signal, the filter characteristic of the preselector being asymmetric with respect to the predetermined actual frequency of the optical signal~~.

11. (Currently Amended) The method of claim 1, wherein the at least one interference signal includes two or more interference signals, the method further comprising ~~the steps of~~:

determining the actual beat frequencies of ~~at least two, preferably at least three,~~ the two or more interference signals ~~generated by the superposition of the optical reference signals with the optical signal~~,

evaluating a deviation value by comparing the ~~detected~~ actual beat frequencies of the two or more interference signals with ~~the~~ target beat frequencies, the deviation value indicating a mismatch, if any, between the target beat frequencies and the actual beat ~~frequency~~frequencies,

evaluating the sign of the deviation value on the basis of the ~~detected at least two, preferably the at least three,~~ actual beat frequencies of the two or more interference signals.

12. (Currently Amended) The method of ~~claim 1~~claim 11, further comprising ~~the steps of~~:

correcting the actual beat ~~frequency of the superimposed signal~~ frequencies of the two or more interference signals to the target ~~frequency~~beat frequencies by using the deviation value, when the deviation value ~~is indicating~~indicates a mismatch between the target ~~frequency~~beat frequencies and the actual ~~frequency of the optical signal~~beat frequencies.

13. (Currently Amended) The method of ~~claim 1, further comprising the steps of:~~

~~evaluating the sign of the deviation value on the basis of the detected beat frequencies of the superimposed signal by comparing the at least two actual beat frequencies with at least two~~ claim 11, wherein the target beat frequencies are provided by at least two electrical oscillator signals.

14. (Currently Amended) The method of claim 13, further comprising ~~the steps of~~:

comparing the ~~at least two~~ actual beat frequencies of the two or more interference signals with the ~~at least two actual~~target beat frequencies by mixing the ~~at least two~~ actual beat frequencies of the two or more interference

signals with the at least two electrical oscillator signals.

15. (Currently Amended) The method of claim 2, ~~further comprising the steps of~~:

wherein the frequency distance between each adjacent optical reference signal of the comb is determined by mode-locking the plurality of optical reference signals of the comb to the master clock signal.

16. (Currently Amended) The method of claim 2, further comprising ~~the steps of~~:

locking the comb to an absolute optical frequency reference by locking at least one of the plurality of optical reference signals of the comb to the absolute optical frequency reference ~~preferably~~ by means of a phase locked loop.

17. (Currently Amended) The method of claim 16, further comprising the steps of:

superimposing at least two of the plurality of optical reference signals of the comb with the optical signal to create at least two interference signals having actual beat frequencies,

evaluating the sign of ~~the~~a deviation value ~~on the basis of the detected at least two actual beat frequencies~~determined by comparing the at least two actual beat frequencies with at least two target beat frequencies provided by at least two electrical oscillator signals~~,~~

~~comparing the at least two actual beat frequencies with the at least two target beat frequencies~~ by mixing the at least two actual beat frequencies with the at least two electrical oscillator signals~~ each having a target beat frequency~~.

18. (Currently Amended) The method of claim 17, further comprising ~~the steps of~~ determining the target beat frequencies according to the following scheme:

PFk=|F0-FN|, and

PFk being the target beat frequency of the kth electrical oscillator signal 11a, 11b, 11c, k being 1, 2, 3,…, F0 being the target frequency of the optical signal 2, FN=Fref+N*Fm, FN being the Nth optical signal line of the reference comb away from the absolute optical reference line Fref, Fm being the frequency of the electrical master clock signal 6 and Fref being the frequency of the absolute optical frequency reference 16.

19. (Currently Amended) A method of controlling an optical signal, comprising:

determining at least one actual beat frequency derived from a superposition of at least one optical reference signal with the optical signal, wherein the optical signal has an actual frequency,

using the at least one actual beat frequency in order to control the actual frequency,

~~The method of claim 1, further comprising the steps of:~~

providing an error signal for at least three of the actual beat frequencies,

feeding at least three of the error signals into a respective loop filter, and

combining the loop filtered error signals with a positive or negative sign according to the following scheme:

for three loop filtered error signals the sign of each error signal changes every 3/2Fm,

for the at least three target beat frequencies of the at least three electrical oscillator signals PFk a sign change of the error signals occurs every 0.5Fm, and

for one of the error signals every 0.5Fm the sign changes, whereby the sign change is recursive every 3/2Fm, and

Fm being the frequency of the electrical master clock signal, PFk being the target beat frequency of the kth electrical oscillator signal, k being 1, 2, 3,….

20. (Currently Amended) The method of claim 1, wherein the at least one interference signal includes two or more interference signals, the method further comprising ~~the steps of~~:

filtering ~~at least two, preferably three,~~ the actual beat frequencies of the two or more interference signals within a predetermined bandwidth,

the predetermined bandwidth covering the actual frequency of the optical signal,

~~detecting at least two, preferably at least three, actual beat frequencies of a superposition of the optical reference signals of the comb with the optical signal,~~

evaluating a deviation value by comparing the ~~detected~~ filtered actual beat frequencies with ~~the~~ target beat frequencies to detect a mismatch, if any, between the target beat frequencies and the filtered actual beat frequencies.

21. (Currently Amended) The method of ~~claim 1~~claim 20,

~~wherein the filter characteristic of the preselector is asymmetric with respect to the actual frequency of the optical signal,~~

further comprising ~~the step of~~ detecting an intensity difference, if any, between the two or more interference signals ~~of the actual beat frequencies~~, to evaluate a tuning direction of the optical signal when tuning the optical signal and/or to evaluate a sign of the mismatch.

22. (Currently Amended) A method of providing an optical signal, comprising the steps of:

providing at least one optical reference signal having an actual frequency,

~~providing the optical signal having an actual frequency,~~

~~superimposing the at least one optical reference signal with the optical signal,~~

~~executing the method of claim 1 for controlling the actual frequency of the optical signal~~

superimposing at least one optical reference signal and the optical signal to obtain at least one interference signal having an actual beat frequency, and

pre-selecting one or more of the at least one interference signals using a predetermined bandwidth and a filter characteristic that is asymmetric with respect to an actual frequency of the optical signal, to determine a position of the optical signal relative to the at least one optical reference signal.

23. (Currently Amended) A system for controlling an optical signal, comprising ~~the steps of~~:

a signal source for providing the optical signal, wherein the optical signal has an actual frequency,

a reference signal source for providing at least one optical reference signal,

a superimposing unit adapted for superimposing the at least one optical reference signal with the optical signal to yield at least one interference signal having an actual beat frequency,

a preselector adapted for pre-selecting the at least one interference signal within a predetermined bandwidth and using a filter characteristic that is asymmetric with respect to an actual frequency of the optical signal, and

a determining unit ~~adapted~~ for determining ~~at least one actual beat frequency derived from a superposition of at least one optical reference signal with the optical signal having an actual frequency, and~~

~~a controller adapted for using the at least one actual beat frequency in order to control the actual frequency~~ a position of the optical signal relative to the at least one optical reference signal.

24. (Cancelled)

25. (New) A method of controlling an optical signal, comprising:

superimposing at least one optical reference signal and the optical signal to obtain at least one interference signal having an actual beat frequency, and

pre-selecting one or more of the at least one interference signals using a predetermined bandwidth and a filter characteristic that is asymmetric with respect to an actual frequency of the optical signal, to determine a tuning direction when tuning the actual frequency of the optical signal.

26. (New) A system for controlling an optical signal, comprising:

a signal source for providing the optical signal, wherein the optical signal has an actual frequency,

a reference signal source for providing at least one optical reference signal,

a superimposing unit adapted for superimposing the at least one optical reference signal with the optical signal to yield at least one interference signal having an actual beat frequency,

a preselector adapted for pre-selecting the at least one interference signal within a predetermined bandwidth and using a filter characteristic that is asymmetric with respect to an actual frequency of the optical signal, and

a determining unit for determining a tuning direction when tuning the actual frequency of the optical signal.